



City of Moscow Green House Gas Inventory Update

2012

The City of Moscow strives to become more sustainable by reducing municipal greenhouse gas emissions. Emissions reduction is accomplished by utilizing energy efficiency programs, improving the City's use of resources, and increasing the awareness of staff and community members. This report serves as a progress update on the goals and baseline markers set in the 2010 City of Moscow Greenhouse Gas Inventory Report.

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Background - GHG Inventory Report

In order to further its goals of sustainability and emission reduction, the City of Moscow joined the 'International Council for Local Environmental Initiatives' (ICLEI) in 2007 to access the software and experienced staff of the organization. Along with joining ICLEI, the City also established a sustainability internship that focused on creating the City's first evaluation of energy use and emissions. In 2010, the City's sustainability intern Angie Vanhoozer published the City of Moscow Green House Gas (GHG) Inventory Report. The report outlined the City's stance on sustainability related to climate change and emissions reduction as well as establishing the baseline year 2005 values for energy use and GHG emissions.

Shortly after the completion of the GHG Inventory Report, City administration looked into the usefulness of ICLEI and decided to cancel the City's membership. Upon leaving ICLEI, there was a need for new techniques to measure energy use and emissions analysis without the use of the original software from the GHG Inventory Report. It was determined that a new method should be used to analyze energy data and emissions with simple and verifiable calculations. With that in mind, this report primarily keeps data in its source units and not a total conversion to GHG emissions, creating a much more understandable approach to conservation and a more accurate gauge for measuring efficiency upgrades and emissions reduction

Reduction Goals

Local governments around the world are setting GHG emissions goals and leading their communities by example. In 2010, through the adoption of Resolution 2010-18, the City of Moscow set its own reduction target at 20% by the year 2020, which is 3% higher than the reduction pledged by the U.S. Government. This pledge not only gives a positive example for the Moscow community, but also shows that the City of Moscow is consciously monitoring its consumption of resources and attempting to cut energy expenses.

Municipal Emissions

It was decided that the six sectors described in the GHG Inventory Report that make up the City of Moscow's municipal emissions would be evaluated individually:

- Buildings
- Water/Wastewater
- Streetlights
- Vehicle Fleet
- Solid Waste
- Employee Commute

Each sector is discussed with the method for tracking energy use and GHG emissions.

Buildings, Water/Waste Water, Streetlights

The buildings, water/wastewater, and streetlights sectors are the largest users of energy and also represent the most GHG emissions. These sectors are the focus of most of the City's sustainability efforts. Since 2005 there have been numerous retrofits completed in City buildings and throughout the water system. Tracking the effect of these retrofits is difficult and the results are often unpredictable. Finding a new way to measure changes in energy use was a priority, and the search led to the Portfolio Manager program provided by Energy Star and the EPA.

Portfolio Manager is an online tool that allows users to manage and analyze the energy usage and GHG emissions of multiple facilities ranging from office buildings to wastewater treatment plants. It provides a single location for City staff to view and add information relating to City facility energy use on a month-to-month basis. The tool also provides reliable calculations and easy to use reporting features. There is an update scheduled for the tool coming in 2013 that will allow the City to not only evaluate facilities, but also water/wastewater systems and streetlights.

All City buildings, water/wastewater systems, and streetlights will be fully established in the Portfolio Manager system by the time the upgrade comes on line in 2013. Back entering energy data and space usage for each facility to a baseline year of 2005 is still in the process of being completed. For future entries it is convenient that Avista Utilities is an Energy Star partner and provides automated benchmarking services through the Portfolio Manager. This means that they automatically enter new electrical usage and charges each month as they become available for all relevant meters, both electric and natural gas.

Emissions Reduction

Retrofits and upgrades have been conducted in the buildings, water/wastewater, and streetlight sectors to help reduce the overall GHG emissions of the City of Moscow:

- Buildings have been retrofitted with T8 and HOT5 fluorescent fixtures and bulbs to replace inefficient T12 fixtures. Incandescent bulbs have been replaced with compatible CFL bulbs.
- Preliminary energy audits have been completed at all City facilities by sustainability intern Brady McNall to identify all low-cost energy-efficiency opportunities available. The results of these audits are being evaluated by City staff for feasibility and priority.
- Variable frequency drives and other efficiency measures have been considered and installed at multiple City wells and booster stations.
- The Wastewater Treatment Plant has undergone multiple retrofits for lighting and wastewater processing equipment. Wastewater Supervisor Todd Swanstrom has put a large amount of effort into creating a more efficient treatment plant and continues to investigate new opportunities.

- Streetlights and traffic signal upgrades have been a very important issue to the City of Moscow and retrofits are discussed in detail in the next section.

Streetlights and Traffic Signals

There has been an emphasis placed on streetlight retrofits throughout the country. The City of Moscow has also looked into LED retrofits for traffic signals and streetlights. To date, almost all LED retrofits have taken place in traffic signals and only a limited number of streetlights have been upgraded. With the success of the traffic signals, it is shown that the cost reductions from the LED bulbs are even higher than anticipated. The energy use has been reduced by 80-90% on all traffic signals that have been retrofitted. There are several exceptions that should be noted:

- Jackson Street Parking Lot and A Street & Jackson Street are both retrofitted but were subject to meter changes when retrofitted and only a partial year of data is available.
- 6th & Main Street is one of the meters that needs to be audited to determine the extra load source as there is more power being used than the traffic signals can account for.

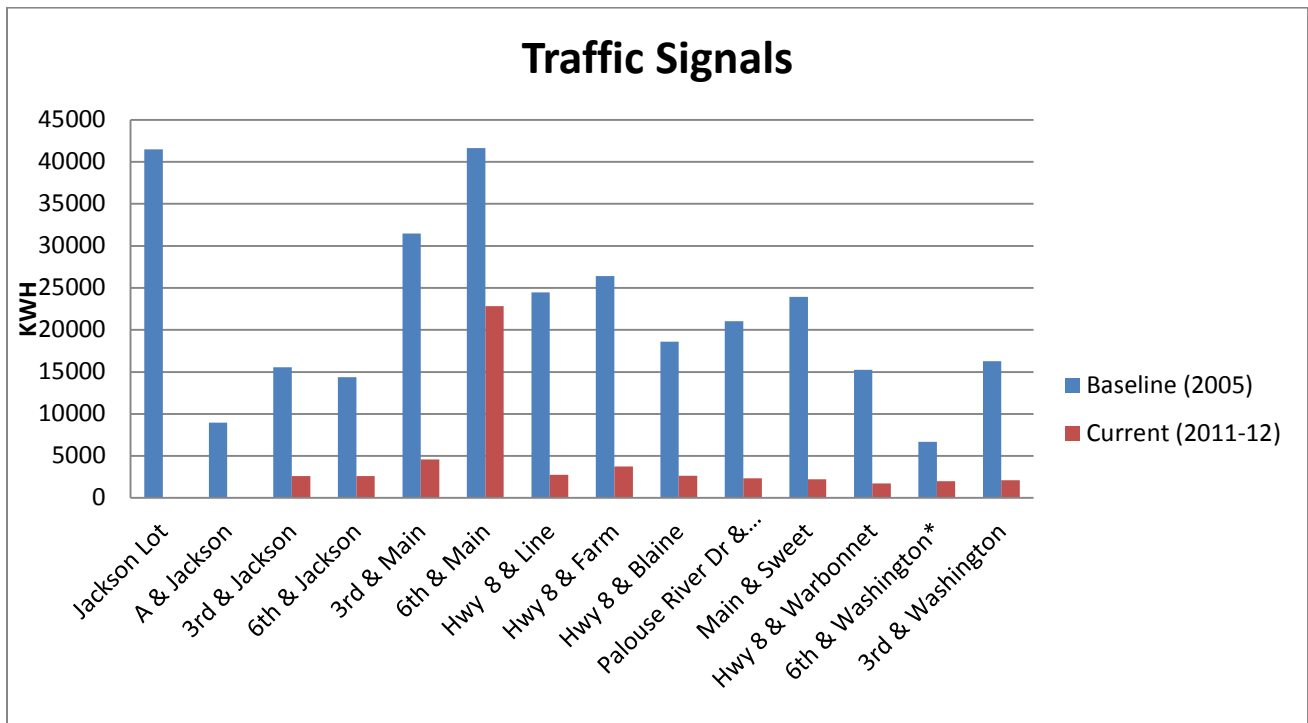


Figure 1 Traffic Signal Retrofits

It is hoped that with the success shown by the LED retrofits and the gradually decreasing price of LED bulbs, the City will soon be able to fully retrofit all street lighting.

Vehicle Fleet

From 2005-2010 the City of Moscow saw a 20% increase in fuel usage for the City fleet shown in Figure 2. In order to mitigate this increase, the City started the Moscow EcoDriver Program. In 2011, the City fleet set a goal of a 3% reduction compared to 2010 fuel usage. We are proud to announce that from April 2011 (start of the program) to April 2012, the City reduced fuel usage by 8% (\$17,300) compared to 2010. The program consists of training staff on efficient driving techniques, fuel saving tips, and maintenance guidelines for using City Vehicles.

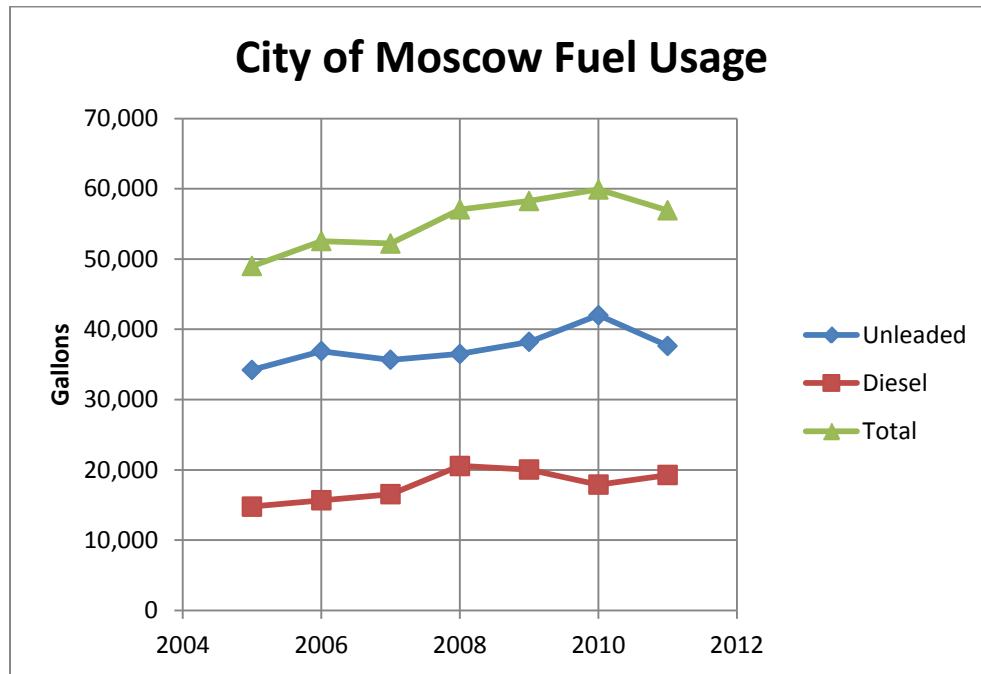


Figure 2 Fleet Fuel Usage

Solid Waste

There is no established baseline for the City of Moscow from the 2010 GHG Inventory Report for solid waste reduction comparisons. The 2010 Inventory Report used values for municipal solid waste (MSW) of 13,481.63 tons and 10,313.88 tons of non-municipal solid waste (NMSW). These values are accurate but they represent all solid waste exported by LSI from Latah County and not the specific tonnage for the City of Moscow. Comparative values are shown below in Figure 3 for 2005-2012, but these do not represent the City specifically. They do provide some interesting information however. The darker section is MSW and the lighter represents all diverted waste. The specific breakdown of the diverted waste is shown in Figure 4 and shows some encouraging values for recycling, composting, and NMSW such as construction and demolition waste, bio-solids, and yard-waste.

Consulting with City of Moscow Sanitation Manager Tim Davis, it was discovered that the City of Moscow only represents a very small portion of the total waste reported. In total, the City has 1456 yards of dumpster volume collected each year. At the standard value for commercial waste of 360

lbs/yard, this comes to an annual total of 262 tons of waste which is approximately 1.64% of the total amount stated in the 2010 Inventory Report.

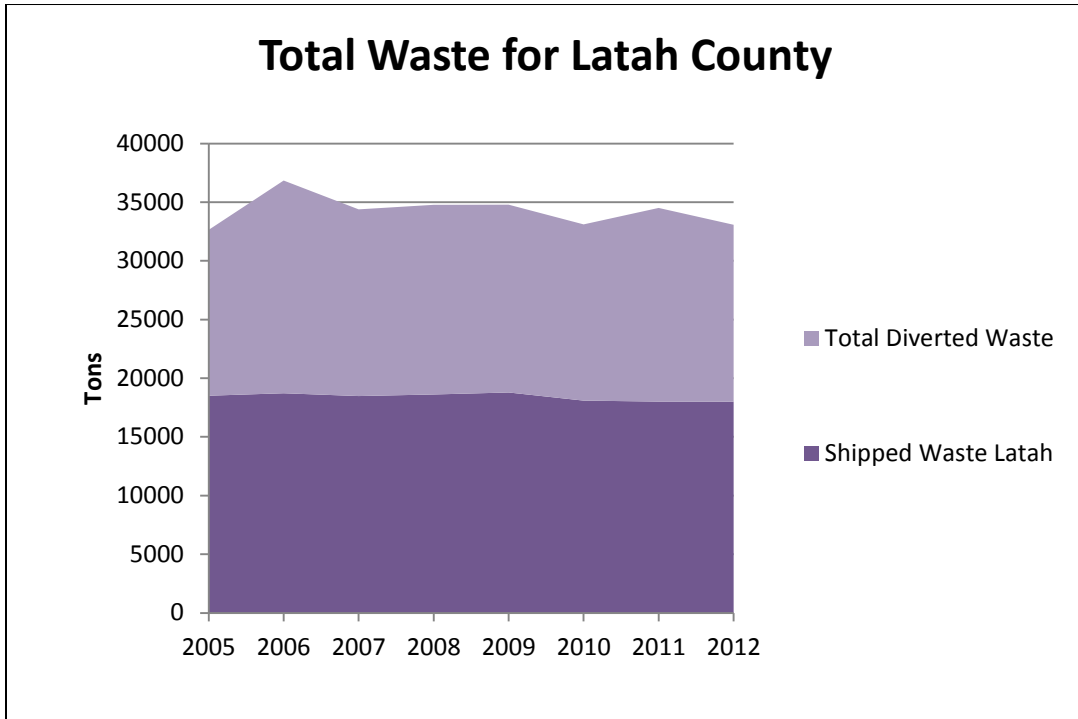


Figure 3 Total Waste Shipped

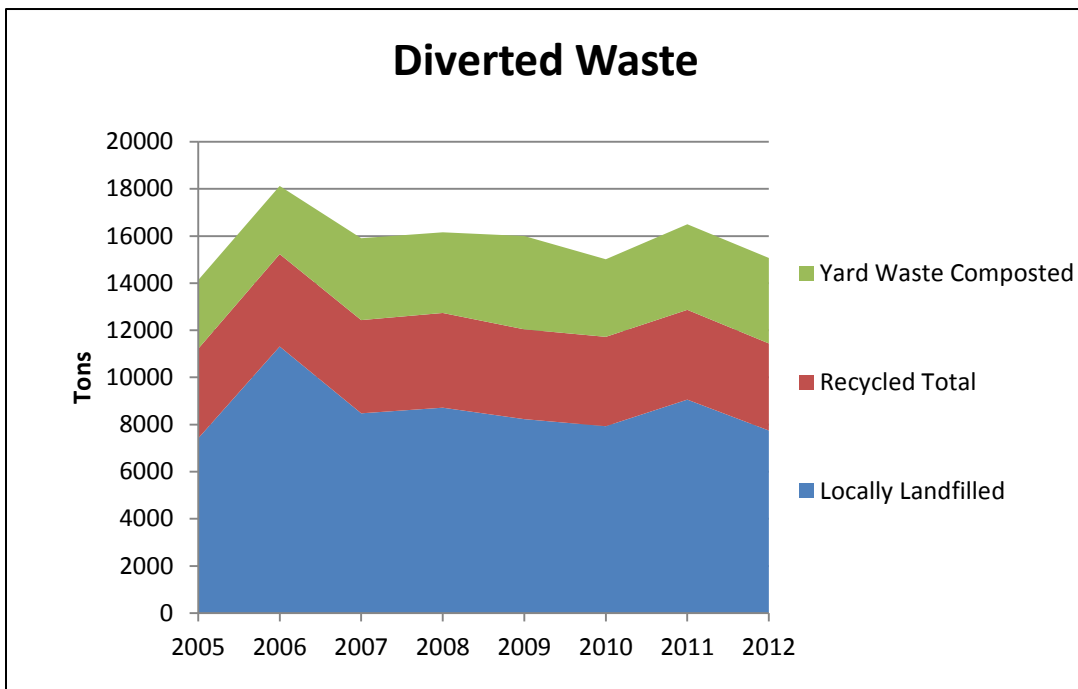


Figure 4 Breakdown of Diverted Waste

Employee Commute

The employee commute sector was included in the GHG Inventory Report and consisted of a survey that established how employees commuted to and from work on a typical day. This sector was included in the GHG Inventory Report as a reminder to employees that each person's carbon footprint extends outside of their professional lives and into their personal lives. It is the hope of the City that as staff become more accustomed to being sustainable at work, it will carry over to their personal lives and they will begin to educate friends and family as well. A good example of skills that apply outside of work are those learned through the Moscow EcoDriver training which encourages employees and community members alike to use alternative transportation and use vehicles efficiently when necessary.

Community Emissions

Community emissions were included in the GHG Inventory Report to show the tendencies of the entire Moscow community with regards to energy use and GHG emissions. The City of Moscow only accounts for a portion of the community's emissions and therefore the emissions of the community must be analyzed in a different way. It should also be noted that the energy use of the community is not a good indicator of the performance of City energy efficiency programs.

Electrical

The chart below shows the community's energy use for 2011 compared to the baseline 2005 values; units are expressed in kilowatt hours.

	Residential	Commercial	Industrial	Traffic Signals	Total
2005	83,448,890	128,240,434	3,131,844	944,510	215,765,679
2011	91,802,337	116,846,916	2,613,101	978,638	212,240,992
Change	+8,353,447	-11,393,518	-518,743	+34,128	-3,524,687

Natural Gas

Units are in Therms.

	Residential	Commercial	Industrial	Traffic Signals	Total
2005	3,077,877	2,895,961	41,630	N/A	6,015,468
2011	3,423,158	2,708,582	217,907	N/A	6,349,647
Change	+345,281	-187,379	+176,277	N/A	+334,179

Future Work

Creating a new framework for a reliable and simple way to measure and track energy use and GHG emissions is very important for the City of Moscow. The next steps in creating such a framework are as follows:

- Complete all facility, water/wastewater system, and streetlight accounts on Portfolio Manager with and established 2005 baseline.
- Train selected City staff and administration on the use of Portfolio Manager.
- Prioritize energy efficiency and GHG reduction initiatives based on financial and environment potential.
- Pursue new grant funding opportunities to accomplish the 20% reduction in GHG emissions by the year 2020.